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Monterey, California, Research and Sponsored Programs, Office of the Vice President and Dean of Research, Naval Postgraduate School (U.S.)

Naval Postgraduate School Research, v. 4, no. 6, March 2012 ; pp. 1-12

VOLUME 4, NO. 6 MARCH 2012

RESEARCH AT NPS

Distinguished Professor Haegel

Distinguished Professor Nancy Haegel, Department of Physics, has been awarded a J. William Fulbright foreign scholarship for study in Israel, beginning in December 2012.

Professor Haegel will be among a group headed by Professor Aaron Lewis, a pioneer in near-field microscopy. The group will build upon work performed at NPS in near-field imaging in the scanning electron microscope. Near-field optics means that things are images so close to their surfaces, diffraction cannot occur. This leads to some of the highest resolution imaging possible for materials science and biophysics.

Developing international understanding requires a commitment to establishing open communication and long-term cooperation. In this way, Fulbright scholars enrich the educational, political, economic, social and cultural lives of countries around the world. Participants demonstrate the service, excellence, and leadership that have been hallmarks of the program for over 60 years and help fulfill its principal purpose, which is to increase mutual understanding among the people of the United States and those of the more than 150 countries that currently participate in the Fulbright program.

BROWN-BAG SEMINAR SERIES

WA-302, 1200-1300

- Tuesday, 13 March, Intergovernmental Personnel Act Agreements (HA-204)
- Wednesday, 11 April, Research Safety
- Wednesday, 9 May, Grants: How We Utilize at NPS

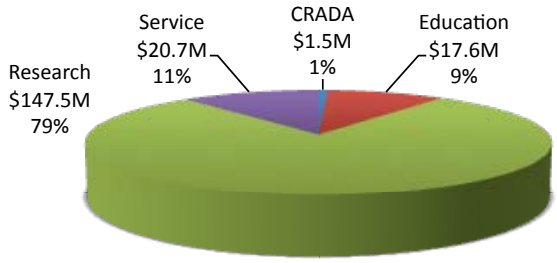
RESEARCH UPDATES

- New hires in the RSPO are Sandi Leavitt, deputy director, research administration; Deborah Shifflett, deputy director, sponsored programs administration; and Donna Cuadrez, director, thesis services. We continually strive to strengthen our support for the faculty and students.
- Updated Sponsored Program Policy and Guidance Memoranda have been posted:
  - ✓ Categories of sponsored programs: http://intranet.nps.edu/ResAdmin/SPPGM-12-20.pdf
  - ✓ Electronic proposal submission: http://intranet.nps.edu/ResAdmin/SPPGM-11-14_.pdf
- The National Science Foundation requirement for responsible conduct for research has been formalized in a policy memo, http://intranet.nps.edu/ResAdmin/SPPGM-11-21.pdf. Meetings will be held with current NSF PIs to review requirements.
- NPS researchers may be able to trim transportation costs for shipping by working through Tom Tuttle, Monterey site manager for Fleet Logistics Center, Monterey. Mr. Tuttle can be reached at extension 3263 or email totuttle@nps.edu.
- Unmanned-systems safety requirements have been posted at http://intranet.nps.edu/ResAdmin/Safety/UnmannedSystemSafety/index.html.

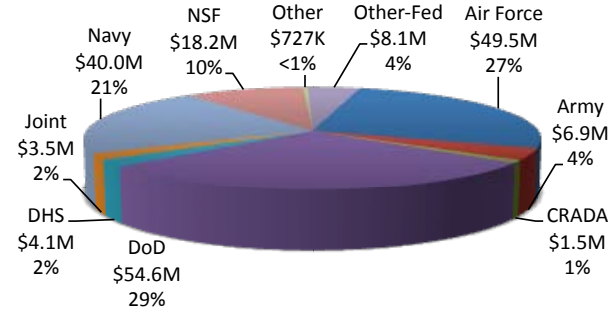
SPONSORED PROGRAMS STATUS, FEBRUARY 2012

FUNDS AVAILABLE: $187.3M

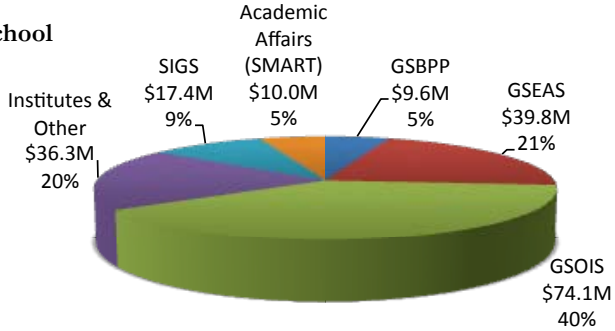
By Type of Activity



By Sponsor



By School



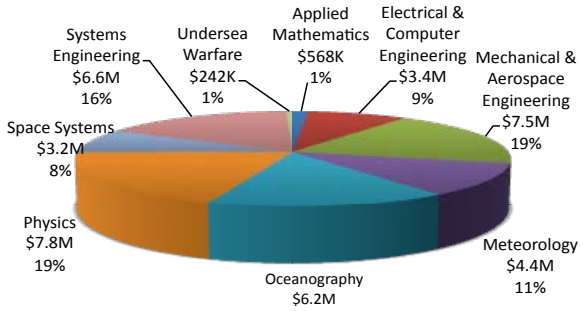
Research and Sponsored Programs Office (RSPO)
Office of the Vice President and Dean of Research
Naval Postgraduate School

Danielle Kuska, Director
Research and Sponsored Programs Office
research@nps.edu

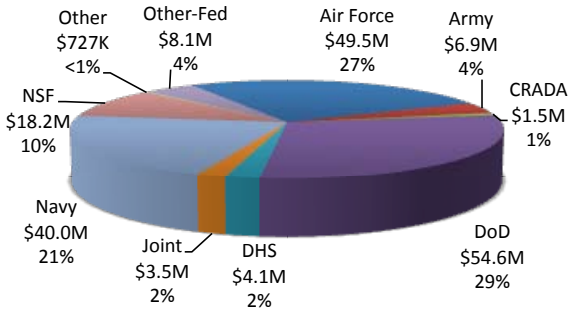
Graduate School of Engineering and Applied Sciences

Funds available to date: $39.8M

By Department



By Sponsor



Projects funded in February

- C4I Chair, *Rachel Goshorn, EC* (PEO C4I)
- Information Theory-Approach to Collection, *Deborah Goshorn, EC* (NRO)
- Railgun Power Supply, *Alex Julian, EC* (ONR)
- Space-Based, Software-Defined Radio, *Hersch Loomis, EC* (SAF)
- Electrical-Energy Management Systems for Shipboard and Land-Based Navy Applications, *Giovanna Oriti, EC* (ONR)
- Interference Mitigation in 4G Communications, *Ric Romero, EC* (NRO)
- Estimation of Atmospheric Parameters in SAR Imaging, *Ric Romero, EC* (NRO)
- Study of Radiation Influenced Defects in (Al,Ga)N/Si, *Todd Weatherford, EC* (DTRA)
- Gallium Nitride HEMT Reliability Analysis, *Todd Weatherford, EC* (AFRL)
- Shipboard Calibration Enhancement, *Xiaoping Yun, EC* (NSWC)
- Efficient High-Order Time Integrators for Local High-Order Discretization Methods, *Frank Giraldo, MA* (AFOSR)
- Adaptive Optics Center of Excellence for National Security, *Brij Agrawal, MAE* (AFRL)
- Friction-Stir Welding of Ferritic ODS and HT9 Steels, *Luke Brewer, MAE* (DOE-NNSA)
- Crossflow Fan for VTOL Unmanned Air Vehicles, *Garth Hobson, MAE* (National University of Singapore)
- Herding and Active Force Protection Using Autonomous Agents, *Isaac Kaminer, MAE* (ONR)
- Technology for Reducing Energy Use on U.S. Navy Ships and Facilities in Support of E-Step, *Knox Millsaps, MAE* (ONR)
- Smart CMG Control Electronics for Enhancing Spacecraft Performance, *Michael Ross, MAE* (SAF)
- Sheer Effects on Convection for Different Stages of TC Development Observed in TCS08, *Chih-Pei Chang, MR* (ONR)
- Meteorological Measurements in Support of a Passive Imaging System, *Paul Frederickson, MR* (AFRL)
- RFC/HWDDC Environmental Data Collection at Wallops Island, *Paul Frederickson, MR* (SSC-Pacific)
- Aircraft Measurements for Air-Sea Coupling and Improving Coupled Model Predictions, *Qing Wang, MR* (ONR)
- Aircraft Observation for Improved Physical Parameterization for Seasonal Prediction, *Qing Wang, MR* (ONR)
- Special Research Awards in Ocean Acoustics: Postdoctoral Fellowship, *John Colosi, OC* (ONR)
- Development of Real-Time Signal-to-Noise Ratio Estimation Systems (SNORES), *John Joseph, OC* (ONR)
- State Estimation & Prediction of Coupled Pan-Arctic Climate System, *Wieslaw Maslowski, OC* (ONR)
- CeNCOOS: Integrating Marine Operations for Decision Makers and the General Public, *Jeff Paduan, OC* (NOAA)
- Autonomous Ocean Flux & Wave Buoys for Use in the ONR Marginal Ice Zone (DURIP), *Tim Stanton, OC* (ONR)
- Super-Energetic Explosive Behavior: Effect on Shaped Charged Jetting, *Ron Brown, PH* (ONR)
- Coulomb Explosion of Metastable Atomic Clusters, *Joe Hooper, PH* (ONR)
- PEO-IWS Theses and Curriculum Support, *Andres Larraza, PH* (NAVSEA)
- NPS Beam Physics Laboratory Directed Energy Fundamental Research, *John Lewellen, PH* (ONR)
- NPS Railgun Technology, *Bill Maier, PH* (ONR)
- Technical Analysis for Target Detection, *Chris Olsen, PH* (OSD)
- Support to the ISSO, *Chris Olsen, PH* (SAF)
- Maritime In Situ Sensing Inter-Operable Network, 6.2, *Joe Rice, PH* (ONR)
- Advanced Reactor Concept Program, *Kevin Smith, PH* (DOE)
- PMS 485 Systems and Software Cost-Estimation Support, *Ray Madachy, SE* (SPAWAR)
- MSSE-DL, *Wally Owen, SE* (USA ASC)
- MSSO-DL Cohort 316-092, *Rudy Panholzer, SP* (Various)
- NPS ASW Certificate Program, *Daphne Kapolka, UW* (CNO)

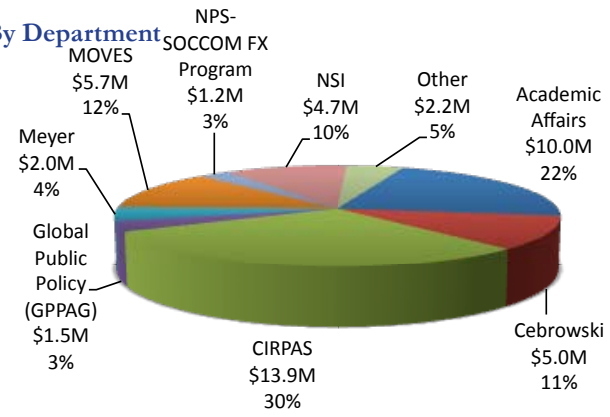
CALHOUN LIVES!

The Dudley Knox Library has launched a beta version of their electronic thesis and dissertation (ETD) repository, "Calhoun." It will be live outside NPS starting April 2nd. Calhoun will hold all institutional publications, reports, theses, and dissertations created by faculty, staff, students, and researchers since 1923. Congratulations to the library and staff for so much progress with this huge project. See http://calhoun.nps.edu/ and http://libguides.nps.edu/calhoun.

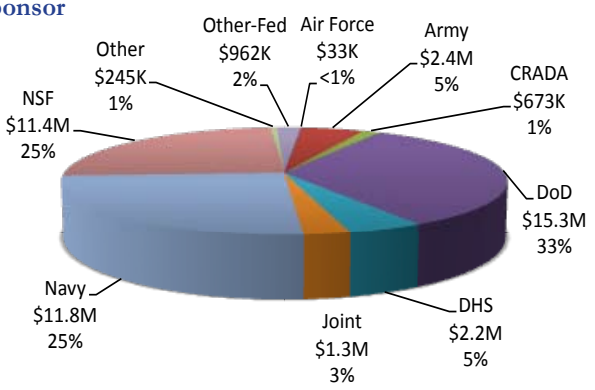
Research and Education Institutes, Centers, and Other

Funds available to date: $36.3M

By Department



By Sponsor



Projects funded in February

- Naval Executive Development Program: Strategic Thinking, *Ron Franklin, CEE* (Various)
- Small-Business Innovation Research & Small-Business Technology-Transfer Support, *Alan Howard, USPTC* (ONR)
- Lower Mekong Countries Disaster-Management Workshop, *Alan Jaeger, NSI* (USPACOM)
- Technical Support for Collaborative Sensor Visualization Capability, *Alan Jaeger, NSI* (NAVAIR)
- Search and Rescue Optimal Planning System #23, *Alan Jaeger, NSI* (USPACOM)
- AEA & Joint Electronic Attack & Compatibility Office Program, *Alan Jaeger, NSI* (NAWC-Weapons Division)
- Programming the Laws of Armed Conflict for Unmanned Systems, *George Lucas, NSI* (ONR)
- Multi-International Expertise, Technical Support for Ground Systems, *Chris Olsen, NSI* (NGIA)
- Netcentric Certification Office, *Chris Gunderson, Cebrowski* (JITC)
- Command and Control Rapid Prototyping Continuum (C2RPC), *Warren Yu, Cebrowski* (ONR)
- Advanced Human Systems Initiatives, *Paul Chatelier, MOVES* (ONR)
- Innovation Strategy & Technology Experimentation, *CDR Joe Sullivan, USN,* MOVES (ONR)
- Slice Project at McMillan Airfield, *Bob Bluth, CIRPAS* (SAF)

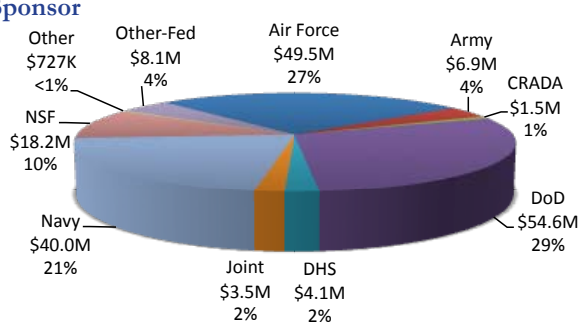
Graduate School of Business and Public Policy

Funds available to date: $9.6M

Projects funded in February

- 9th Acquisition Research Symposium, *Keith Snider* (Various)
- Chair of Acquisition and Acquisition Research Program, *Keith Snider* (DASN, Acquisition and Procurement)

By Sponsor



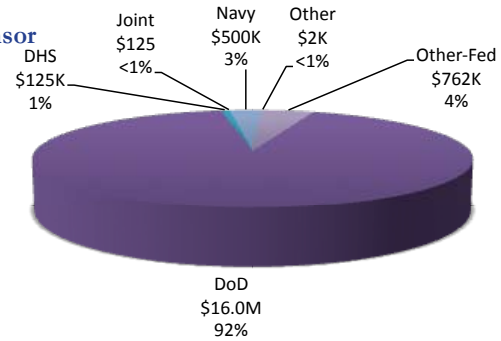
School of International Graduate Studies

Funds available to date: $17.4M

Projects funded in February

- Project on Advanced Systems and Concepts for Combating WMD (PASCC FY12 Studies and Dialogues), *Anne Clunan* (DTRA)
- Project on Nuclear Issues, *Anne Clunan* (DTRA)
- Military Innovation, Organizational Learning, and Performance in Irregular Warfare in Afghanistan, *Dan Moran,* NS (CTTSO)

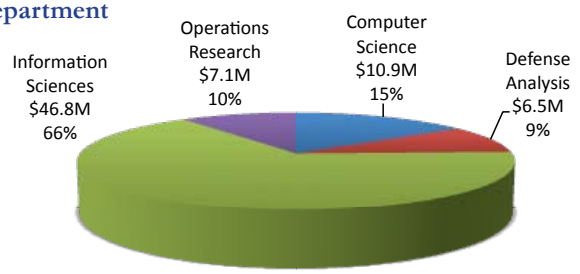
By Sponsor



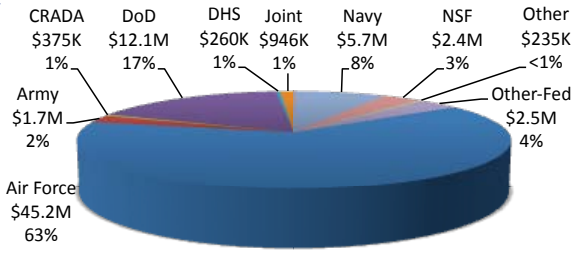
Graduate School of Operational and Information Sciences

Funds available to date: $74.1M

By Department



By Sponsor



Projects funded in February

- Risk-Based Specification, Validation and Verification Using Software Slicing, *Valdis Berzins, CS* (Nat Univ of Singapore)
- DHS Cybersecurity Curriculum Program, *Cynthia Irvine, CS* (DHS)
- Xplane, *Dennis Volpano, CS* (ONR)
- Trident Warrior: Flex Experimentation FY12, *Shelley Gallup, IS* (ONR)
- Improving the Resilience of Guam Military Infrastructure, *David Alderson, OR* (AFRL)
- Next-Generation Network Science, *David Alderson, OR* (ONR)
- An Analysis and Testing of the Defender–Attacker–Defender (D–A–D) Model, *David Alderson, OR* (U.S.Coast Guard)
- The Human Social Cultural Behavior Modeling Initative at the Naval, *Jeff Appleget, OR* (ONR)
- Large-Scale Optimization, *Gerald Brown, OR* (ONR)
- Design of a Flotilla of Coastal Combatants for Western Pacific Operations, *Jeff Kline, OR* (OSD)
- Applied Physics Lab Experience Tour, *Jeff Kline, OR* (Johns Hopkins University)
- Master's in Cost Estimating and Analysis (MCEA) Program, *Greg Mislick, OR* (PEO C3T)
- Optimization of Complex Systems, *Johannes Royset, OR* (AFOSR)

CORE LAB LIGHTHOUSE MOBILE TRAINING IN PHILIPPINES

The CORE Lab mobile-training team (MTT) is providing advanced network-analysis training and field-data collection for ground users, in support of the Joint Special Operations Task Force–Philippines (JSOTF–P).

The purpose of the program is to sharpen ethnographic and sociocultural intelligence by streamlining the collection and analysis of data. Structured ethnographic data is gathered via a smartphone application and analyzed via special software. Known as the "Lighthouse Project," this effort is sponsored by SOCOM with funding from OSD-AT&L. PIs are **COL Greg Wilson, USA,** SOF Chair, Defense Analysis, and **Assistant Professor Sean Everton,** Defense Analysis.

Training kicked off in February 2012 with three segments that introduced advanced network analysis to include social-network analysis (SNA), and field-data collection under the Lighthouse platform. Training was largely hands-on, featuring labs and practical exercises. Participants collected data with the smartphone app, send it to the Lighthouse portal, accessed and navigated the portal, and imported data for analysis, meanwhile learning SNA theory and the Organizational Risk Analyzer (ORA) software package. ORA allows users to move beyond basic link analysis and perform a host of metrics, reports, and network-characteristics visualizations.

By the end of training, participants had worked through the entire Lighthouse process, from collecting data to running basic SNA metrics. The CORE Lab MTT also created customized collection forms for the JSOTF-P's collection and analysis needs.

After the first iteration of classroom training, the CORE Lab MTT completed the first of three outstation visits. This segment focused primarily on instructing field operators in data collection, visualizing data in ORA, and demonstrating the ethnographic-intelligence that results from SNA analysis. The next two training iterations continued this basic format and adjusted as necessary to practitioner needs.

See the CORE Lab website at http://www.nps.edu/Academics/Schools/GSOIS/Departments/DA/CORELab/index.html or on Facebook at www.facebook.com/pages/The-CORE-Lab-at-the-US-Naval-Postgraduate-School/257980287583444. Information on the Lighthouse project is at http://lhproject.info/.

CORE Lab MTT personnel visited Mindanao, Basilan, and Jolo for Lighthouse equip fielding and training. Left to right, unknown, Rob Schroeder (MIIS), Daniel Cunningham (MIIS), unknown, and COL Greg Wilson, USA

CRUSER PARTICIPATES IN DC SYMPOSIUM ON ETHICS OF UNMANNED SYSTEMS

Robo-Ethics: Rhetoric vs. Reality, a two-day symposium addressing social, cultural, legal and ethical aspects of unmanned-system employment, was held January 25–26 at the Pentagon Conference Center. Sponsors were the NPS Consortium for Robotics and Unmanned Systems, Education, and Research (CRUSER), ONR, and DCNO for Information Dominance (N2N6).

Designed as continuing education for warfighters and policymakers assigned to the Pentagon and D.C.-area commands, the symposium's interdisciplinary syllabus fielded four panels:

- Robot Rhetoric: Revolution or Evolution?
- Rules of War: The Law of Armed Conflict
- Reciprocity: Worth Killing For vs. Worth Dying For
- Praise and Blame: Moral Agency and the Ambiguity of Accountability in Robotics

Faculty panelists from the Navy's three educational institutions, as well as SECDEF staff, Navy JAGC, and a retired general officer, contributed their expertise in weapons and systems engineering, military and naval history, joint-campaign analysis, operations research, international law, and applied ethics. Active and retired naval officers represented the surface warfare, submariner, aviator, nuclear engineering and JAGC communities; most were post-command.

The organizations represented by the hundred-plus participants included USNA, NWC, ONR, OSD, joint staff, DOS, Virginia Tech, and Navy staff. CRUSER director **Jeff Kline** commented "This is our first major outreach to support CRUSER's mission of continuing education in support of robotics and unmanned systems. This symposium provided an effective venue to bring together lawyers, ethicists, engineers and warfighters to openly debate the myriad of ethical issues we will face in future."

The discussion was particularly concerned with how the issues discussed might or should affect policy; the significance of fiscal drivers; and the challenge of integrating semi- and fully autonomous weapons platforms into the arsenal a tactical commander might employ.

The first panel considered whether robotic technologies represent a difference in kind or degree—whether "revolutionary" or "evolutionary." Presentations were made on heroic, systemic, and systematic forms of war, and the place of robots within each, and on different types of conflict within a continuum of lethality, autonomy, and speed (CLAS).

The "Rules of War" panel reviewed the law of armed conflict (LOAC), differences between LOAC and international humanitarian law, and the relevance of both to policies concerning robotic design, development, and tactical operations. Questions of whether and how traditional constraints upon weapons and new technologies are relevant to robotic weapons, or whether these call for a new paradigm, were explored, and myths regarding the relationship between robotic, unmanned weapons and U.S. obligations under treaty and law were clarified.

Professor Wayne Hughes, CAPT, USN (ret.), Operations Research, and **Mark Dankel,** National Security Institute, spoke on the "Reciprocity" panel. Hughes focused on ethical challenges and the possible consequences—good or bad—of robotic and cyberspace attacks. He discussed his research on collateral casualties in historical conflicts, pointing out the considerable fratricide in 20th Century sea battles and contrasting the high rates of discrimination and accuracy achieved today. Dankel addressed chivalry as an anachronism, the moral imperative to protect just combatants using standoff weapons such as robotic technologies, and the "tether of duty"—the license and limit of using remotely operated and autonomous weapons within the requirements of jus in bello.

Serving on the "Praise and Blame" panel, **Professor George Lucas**, Graduate School of Public Policy, explored whether the "rhetoric of robotics" is serving us well. He examined problems arising from the anthropomorphism of robot morality and the tendency (in media especially) to suggest that robotic defense technologies are immoral because unaccountable for their actions. But morality requires intention, and a robot has none; it acts as programmed, in response to algorithms and deontic logic. Because failures are caused by mechanical or software problems, Lucas's presentation focused on safety and reliability. Other panel topics were the brittleness of autonomy in robots and its relationship to risk analysis when building accountability into trustworthy systems; the relationship between robotic technologies and personnel costs; and the jus in bello challenges of discrimination and proportionality.

For detailed information on the symposium, see http://www.nps.edu/Research/cruser/roboethics.html.

Panelists and sponsors of the Robo-Ethics Symposium L-R: George Lucas, NPS; CAPT John Canning, USN (ret), NSWC Dahlgren; Mark Dankel, NPS; Paul Siegrist, N2/N6; BG Mark O'Meara, USA; Pete Pedrozzo, NWC; CAPT Wayne Hughes, USN (ret), NPS; CAPT Jack Nicholson, USNA; CAPT Mark Haggerott, USNA; Paul Scharree, OSD; CDR Steve Martin, ONR; CAPT Carol O'Neal, USN (ret), NPS; and CAPT Jeff Kline, USN (ret), CRUSER director

Please submit your faculty and research news (published articles, conference proceedings, conference presentations, books, honors received, accomplishments, milestones, etc.) to research@nps.edu.

APPLIED MATHEMATICS

Professor Beny Neta and Professor Changbum Chun from Sungkyunkwan University in South Korea are working on comparison of the basins of attraction for various optimal methods for the solution of nonlinear equations. Chun is planning on spending his sabbatical year at NPS. Neta is also working with Professor Zurab Kiguradze, visiting from the Republic of Georgia. Their joint work on the numerical solution of system of nonlinear integro-differential equations is continuing. This cooperation started in 2007.

Beny Neta and Changbum Chun, "On optimal fourth-order iterative methods free from second derivative and their dynamics," *Applied Mathematics and Computation, Volume 218, (2012), pp. 6427-6438.*

Eroh, L., & **Gera, R.** (2012). Alliance partition number in graphs. *Ars Combinatoria*, 103, 519-529.

Fox, J., **Gera, R., & Stanica, P.** (2012). The independence number for the generalized Petersen graphs. *Ars Combinatoria*, 103, 439-451.

CENTER FOR DECISION, RISK, CONTROLS AND SIGNALS INTELLIGENCE (DRCSI)

Sri Sritharan has returned from an extended trip to Taiwan and India in which he visited National Chiao Tung University, Taiwan (for research collaboration), the Indian Institute for Science Education and Research (IISER) at Trivandrum (to give a seminar and conduct research), and Bharadhiyar University in Coimbatore, India (to provide a ten-lecture series on large-deviations theory). He gave the S. S. Pillai Endowment Lecture at the Ramanujan Institute for Mathematical Sciences, University of Chennai, and lectured in Bangalore at the Indian Institute of Science, Tata Institute for Fundamental Research Mathematics Center, and the International Conference on Unmanned Autonomous Systems. At the latter, he represented the USN on the future unmanned, autonomous systems roadmap panel. Sritharan subsequently led the NPS team at an ONR Counter-Directed-Energy Program Review in a presentation in Washington D.C.

DEFENSE RESOURCES MANAGEMENT INSTITUTE

Jonathan Lipow & **Jay Simon,** "Military Reserves and Social Welfare," *Economics Letters* 113(3) 208-210.

Simon, J., & **Melese, F.** (2011). A Multiattribute Sealed-Bid Procurement Auction with Multiple Budgets for Government Vendor Selection. *Decision Analysis* 8(3) 170-179.

Guyse, J. L., & **Simon, J.** (2011). Consistency Among Elicitation Techniques for Intertemporal Choice: A Within-Subjects Investigation of the Anomalies. *Decision Analysis* 8(3) 233-246.

Assistant Professor Jay Simon reviewed papers for the *Journal of the Operational Research Society* in November and reviews for *Decision Analysis* on a continuing basis. He is an associate editor of *Decision Analysis.*

Assistant Professor Jomana Amara attended the 7th Annual Peacekeeping, Reconstruction, and Stabilization Conference in Alexandria, Virginia, February 7–9. The theme was transitioning from conflict and disaster to security. Amara's talk, "Progressing Reconstruction Efforts," presented steps developers should follow in transitioning to peace, stressing that recurrent civil war is a prevalent form of armed conflict worldwide and post-conflict reconstruction is not normal economic development, but entails a security process and political and social reconciliation. Amara's research, "Military Stabilization Efforts on Economic Development and Security: The Case of Iraq" will appear in the *Journal of Development Economics.* The article describes U.S. efforts to effect change in Iraq by economic, political, and military means and uses structural change tests to examine security interventions and economic metrics of success. Amara organized a professional-development seminar featuring Seth Shulman, DoD director of compensation and DRMI alumnus, who spoke on developments in civilian compensation.

GRADUATE SCHOOL OF BUSINESS AND PUBLIC POLICY

Sanchez, S. M., T. W. Lucas, P. J. Sanchez, C. J. Nannini, and H. Wan (2012). "Designs for large-scale simulation experiments, with applications to defense and homeland security." In *Design and Analysis of Experiments. Vol.3: Special Designs and Applications* (K. Hinkelmann, ed.), pp. 413-441. Hoboken, NJ: Wiley.

Arkes, J. (2012). How does youth cigarette use respond to weak economic periods? Implications for the current economic crisis. *Substance Use & Misuse*, 47(4), 375-382.

Shen, Y., & Hsia, R. Y. (2012). Does decreased access to emergency departments affect patient outcomes? Analysis of acute myocardial infarction population 1996-2005. *Health Services Research*, 47(1), 188-210.

MECHANICAL AND AEROSPACE ENGINEERING

Luke Brewer is filling the program chair for the Microscopy and Microanalysis 2012 conference, Phoenix, AZ, July 29–August 2. The conference is expected to draw 3,000 attendees. http://www.microscopy.org/MandM/2012/.

METEOROLOGY

Wang, Z., Dunkerton, T. J., & **Montgomery, M. T.** (2012). Application of the marsupial paradigm to tropical cyclone formation from northwestward-propagating disturbances. *Monthly Weather Review,* 140(1), 66-76.

NATIONAL SECURITY AFFAIRS

Cris Matei and **Thomas Bruneau,** "Intelligence reform in new democracies: factors supporting or arresting progress," *Democratization,* June 2011.

Cris Matei and **Thomas Bruneau,** "Policymakers and Intelligence: Reform in New Democracies," *International Journal of Intelli-*

gence and Counterintelligence, Winter 2011-2012.

Jaskoski, M. (2012). "Civilian control of the armed forces in democratic latin america: Military prerogatives, contestation, and mission performance in peru." *Armed Forces & Society,* 38(1), 70-91.

OPERATIONS RESEARCH

Katz, J., Winter, C., **Buttrey, S.,** and Fadel, J., "Comparison of acrylamide intake from Western and guideline-based diets using probabilistic techniques and linear programming," *Food and Chemical Toxicology 50* (2012) 877-883.

Johnson, R. T., Hutto, G. T., Simpson, J. R., & Montgomery, D. C. (2012). Designed experiments for the defense community. *Quality Engineering*, 24(1), 60-79.

Scott Nestler, Jack Levis, Bill Klimack, and Michael Rappa, "The Shape of Analytics Credentialing," *OR/MS Today,* February 2012.

Atkinson, M. P., Fontaine, M. J., Goodnough, L. T., & Wein, L. M. (2012). A novel allocation strategy for blood transfusions: Investigating the tradeoff between the age and availability of transfused blood. *Transfusion*, 52(1), 108-117.

Distinguished Professor Emeritus Peter Lewis was posthumously awarded the Lifetime Professional Achievement Award at the Winter Simulation Conference in December, 2011. This award is the highest honor given by the INFORMS Simulation Society. The award recognizes major contributions to the field of simulation that are sustained over most of a professional career, with the critical consideration being the total impact of these contributions on the field. Lewis a leader in computer simulation, applied statistics and probability, and operations research. His colleagues and former students cite his extraordinary influence and steadfast encouragement in their professional careers. He was a Fellow of the International Statistical Institute, the Institute of Mathematical Statistics, and the ASA.

NATIONAL SECURITY AFFAIRS

Professor Tom Johnson appeared on the PBS News Hour February 27th to discuss the recent attacks on American troops in Afghanistan. The interview included Johnson, a former state department official, and a person from US Institute for Peace: www.pbs.org/newshour/bb/world/jan-june12/afghanistan2_02-27.html.

PHYSICS

Research Professor Ronald Brown organized a university consortium of internationally respected scientist in the fields of organic synthesis, molecular dynamics, reactive flow, and shock physics for participating in a new Office of Naval Research basic energetic-material research initiative. The program will start the last quarter of FY12 and continue until FY17. In addition to the ambitious goal of developing new insensitive molecular systems that rival existing high-performance explosives, consortium members offer graduate research opportunities for NPS students. **Christine Haska** and **Joe LoPiccolo** are planning resources that will be required for interconnecting with the University of Southern California, University of Illinois, and Washington State University.

Kim, B., Phamduy, P., **Sinibaldi, J., & Karunasiri, G**. (2012). Characterization of a micromachined vertically deformable varying-pitch grating for a spectrometer. *Journal of Micromechanics and Microengineering,* 22(1), 015001.

SPACE SYSTEMS ACADEMIC GROUP

Sands, Lt Col Timothy, USAF, "Physics-Based Control Methods," in *Advancements in Spacecraft Systems and Orbit Determination*, edited by Rushi Ghadawala, Rijeka: In-Tech Publishers, 2012.

SYSTEMS ENGINEERING

Roberts, B. & Owen, W. (2011). "Orientation and Engagement of Systems Engineering Distance Education Students." In T. Bastiaens & M. Ebner (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2011* (pp. 552-557). Chesapeake, VA: AACE.

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K. A. Mamun, M. Mace, L. Gupta, C. A. Verschuur, M. E. Lutman, M. Stokes, **R. Vaidyanathan,** S. Wang, "Robust Real-time Identification of Tongue Movement Commands from Interferences," *Neurocomputing,* 80, pp 83-92, 2012.

Burgess S.C., Wang J., **Vaidyanathan R.,** "A Comparison of the Efficiency of the Bicycle with Analogous Systems in Nature," *International Journal of Design and Nature,* 6, 2, pp 16-31, 2011.

Araromi O.A., Conn A.T., Ling C.S., Burgess SC, Rossiter JM, **Vaidyanathan R.,** "Spray-Deposited Multilayered Dielectric Elastomer Actuator," *Sensors and Actuators* A, 167, pp 459-467, 2011.

A. G. Pipe, **R. Vaidyanathan,** C. Melhuish, et al. "Cooperation between Humans and Humanoid Assistive Robots", Chapter 15 in *Biomimetics: Nature-Based Innovation,* eds., Y. Bar-Cohen, CRC Press ISBN-10: 1439834768, Chapter 16, pp 477-494,2011.

Etoundi, A., Burgess S.C., **Vaidyanathan R.,** "A bio-inspired condylar hinge joint for mobile robots, IEEE International Conference on Intelligent Robots and Systems (IROS), 6 pp , San Francisco, CA, USA, Sept 2011.

M. Mace, K. A. Manmun, L. Gupta, S. Wang, **R. Vaidyanathan,** "Ensemble classification for robust discrimination of multi-channel, multi-class ear pressure signals" IEEE International Conference on Engineering in Medicine and Biology (EMBC), pp 1733-1736, Boston, MA, USA, Sept 2011.

MEMORANDA OF UNDERSTANDING/ AGREEMENT (MOU/MOA)

Title: Support for the Chair of Acquisition and Acquisition Research Program at the Naval Postgraduate School
Partner: Office of the Deputy Assistant Secretary of the Navy Acquisition and Procurement
NPS Contact: Keith Snider, Graduate School of Business and Public Policy
Summary: To provide for the sponsorship of the Chair of Acquisition at the Naval Postgraduate School in the Graduate School of Business and Public Policy and support for a program in Acquisition Research at the Naval Postgraduate School.

Title: Funding and Support for Stability, Security, and Development in Complex Operations Certificate Program
Partner: The United States Army Civil Affairs and Physiological Operations Command
NPS Contact: Karen Guttieri, Global Public Policy Academic Group
Summary: To establish support requirements and responsibilities between USACAPOC (A) and NPS in support of execution of the SSDCO program for FY12.

Title: Exploring Potential Activities between Naval Postgraduate School and Pennsylvania State University
Partner: Pennsylvania State University
NPS Contact: Tom Hazard, Office of the Provost–Special Initiatives
Summary: PSU and NPS declare intent to develop research and academic programs in information systems and technology, data fusion, distance learning, and incorporation of certificates and curriculum towards institutional degree offerings.

TECHNICAL SERVICES AGREEMENTS (TSAs)

Title: Antenna Pattern Measurement
Partner: Massachusetts Institute of Technology
PI: Bob Bluth, CIRPAS
Summary: MIT LL is developing an airborne antenna patters measurement system under an Air Force Contract which will characterize radar installations in situ. In pursuit of that goal, MIT LL will demonstrate high altitude performance and precision landing capabilities of the T-16XL. In addition, MIT LL will perform an antenna pattern measurement on a surrogate antenna by flying standard mission profiles. MIT LL will use CIRPAS facility. CIRPAS will provide facility and personnel support.

COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENT (CRADA)

Title: Evaluation of Low-Cost, Open-source Autopilots for Unmanned Vehicles
Partner: Apple Aero, LLC
PI: Oleg Yakimenko, Department of Mechanical and Aerospace Engineering
Summary: Collaborators will research the impact on DoD operations of denial of services provided by space-based systems. The cornerstone of this research will be developing the means to understand the specific operational impacts caused by the denial of these services for the purpose of developing effective mitigation strategies.

PATENT APPLICATION FILED

"Adaptive-Gain Complementary Filter Device and Method for the Determination of Three-Dimensional Estimated Orientation of a Body," Navy case no. 20110004
Inventors: **Xiaoping Yun** and **James Calusdian**, Department of Electrical and Computer Engineering, **Eric Bachmann** and **Robert McGhee**, Department of Computer Science.

TECHNICAL REPORTS PUBLISHED

NPS-GSBPP-11-005	Mark XIV Torpedo Case Study	D. Matthews
NPS-GSBPP-11-007	Identifying Procurement Fraud in Defense Agencies: An Analysis of the Government Purchase Card Program	J. Rendon
NPS-GSBPP-11-008	Assessment of Army Contracting Command's Contract Management Processes (TACOM and RDECOM)	R. Rendon
NPS-GSBPP-11-011	When Disaster Strikes is Logistics and Contracting Support Ready?	A. Apte, E. C. Yoder
NPS-GSBPP-11-012	A Web Service Implementation for Large-Scale Automation, Visualization, and Real-Time Program-Awareness via Lexical Link Analysis	Y. Zhao, S. Gallup, D. MacKinnon
NPS-GSBPP-11-013	The Combinatorial Retention Auction Mechanism (CRAM): Integrating Monetary and Non-Monetary Reenlistment Incentives	P. Coughlan, W. Gates, B. Zimmerman
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NPS-OR-11-005	A Game Theoretic Model of Strategic Conflict in Cyberspace	H. Schramm, D. Alderson, et al.
NPS-OR-11-007	Analysis of Humanitarian Assistance Cargo Transportation	M. Dozier, N. Dimitrov
NPS-SE-11-017	United States Navy Oceanic Armed Reconnaissance System (Capstone)	R. Petrie, et al.

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